

Required Report - public distribution

Date: 6/1/2009

GAIN Report Number: RP 9019

Philippines

BIOFUELS ANNUAL

Philippine Bio-fuel Industry Outlook

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Report Highlights:

While compliance by locally produced coco-methyl ester (CME) with the mandated bio-diesel blend has been met with no major glitches, local production of bio-ethanol from sugarcane has been problematic, making the timely compliance with the mandated blend possible only through imported bio-ethanol. To date, local bio-diesel plants have a surplus production capacity of about 255 million liters annually in contrast to the estimated 170 million liters annual deficit of existing bio-ethanol facilities.

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Executive Summary:

Coco-methyl ester (CME) derived from coconut oil (CNO) is the feedstock currently used for Philippine bio-diesel production the country being the largest CNO producer in the world. The government has also announced plans to launch massive propagation and cultivation of *jatropha* covering around 2 million hectares of unproductive and idle public and private lands nationwide. This effort will produce about 5,600 million liters of bio-fuel in the next 10 to 12 years. As for ethanol production, in addition to sugarcane, other feedstocks under consideration are sweet sorghum and cassava.

There are currently 12 bio-diesel plants capable of producing 395 million liters annually. At a 2 percent blend, an estimated 140 million liters of CME is required annually. The excess CME production capacity is indicative of the industry's potential as a CME exporter although this scenario will largely be determined by how oil prices behave relative to prices of CNO. The surplus capacity is also likely the basis for the Philippine Department of Energy (DOE)'s consideration of increasing the required bio-diesel blend to three (3) percent from the present 2 percent by end of this year. Domestic coconut oil refiners, on the other hand, are discussing with the Philippine government the possibility of promoting an even higher blend of 5 percent bio-diesel blend.

To date, there are only 2 ethanol production facilities in commercial operation. Both facilities have a combined annual production capacity of about 39 million liters. At the current mandated 5 percent bio-ethanol blend, however, overall demand for bio-ethanol this year is estimated at around 208 million liters. The Philippines has been importing bio-ethanol to meet the mandated bio-ethanol blend of 5 percent. However, the bio-ethanol deficit may only be imported 4 years from the time the specific bio-fuels blend became effective or through 2013. Beyond this time, the mandated percentage blend will be reduced to that level local production can only supply. The final blend percentage is to be decided by the National Bio-Fuels Board (NBB). The probability of this happening is high given the inadequate number of bio-ethanol extraction plants currently in operation or under construction.

Author Defined:

POLICY

In January 2007, President Gloria Macapagal-Arroyo signed into law the Philippine Bio-fuels Law or Republic Act 9367 (RA 9367) which mandated the distribution of a one (1) percent bio-diesel blend to increase to a 2 percent blend, and gasoline with a blend of 5 percent bio-ethanol, to increase to a 10 percent blend after 4 years or by February 2011. RA 9367 also provides an incentive of a zero-rated specific tax on the bio-fuels component of blended gasoline or diesel. Other incentives include an exemption from value-added tax for the sale of raw materials in the production of bio-fuels, exemption from wastewater charges under the Clean Water Act, and the extension of financial assistance from government financial institutions for the production, storage, handling, and blending of bio-fuels.

Investors' questions relative to bio-fuel feedstock production have been addressed somewhat by the issuance of Joint Administrative Order No. 2008-1, Series of 2008 or the "Guidelines Governing the Bio-fuel Feedstock's Production, and Bio-fuels and Bio-fuel Blends Production, Distribution and Sale Under RA 9367". Hereinafter referred to as "the Guidelines", the order took effect late March of this year and provide for the creation of a temporary "One-Stop Shop" under the supervision of the NBB to facilitate and expedite the processing of certificates, licenses, permits and other documentary requirements from government agencies related to the bio-fuels industry.

Additionally, the Guidelines outline the rules on the conversion of agricultural lands for bio-fuel feedstock production. A proposed area for bio-fuel feedstock production will have to be DA validated and certified.

The Guidelines specify the criteria for DA certification; the exemptions; as well as the scope and coverage of the DA certification. In general terms, the Guidelines are sensitive to the food vs. fuel issue, i.e., agricultural areas shall not be utilized for bio-fuel feedstock production.

The full text of Joint Administrative Order No. 2008-1, Series of 2008 is provided in the following link: <http://www.doe.gov.ph/Laws%20and%20Issuances/JAO%20No.%202008-1.pdf>

The recent issuance of the Guidelines is likely to enhance more private investments into local bio-fuel feedstock production as well as into the establishment of bio-ethanol facilities. Enthusiasm by potential investors peaked during record-level fuel prices last year, but was dampened after global fuel prices eventually softened. World fuel prices, however, have again started to rise and are currently hovering in the vicinity of the \$60-65 per barrel level, the level bio-ethanol as an economically sound alternative to fuel was reportedly made. The release of the Guidelines coupled with the recent strengthening of world market fuel prices should enhance prospects for further development of the local bio-fuel industry.

A possible complication exists, however, in the likely approval of a new agrarian reform law. The Comprehensive Agrarian Reform Program (CARP) was set to expire in December 2008 but was extended to June 2009 after a joint congressional resolution (extending the CARP to June 2009) effectively lapsed into law after it was not signed by President Gloria Macapagal-Arroyo. A very sensitive issue in the Philippines, the Philippine Congress is expected to approve a new land reform law very soon and this will likely be the key in whether investments will flow into the opening up of additional lands for additional sugarcane production for bio-ethanol use, and/or for the establishment of the appropriate number of ethanol production facilities.

PRODUCTION

CME derived from CNO and is the feedstock currently used for Philippine biodiesel production. The Philippines is a major coconut source and the country is the largest CNO producer/exporter in the world. Local coconut output remains to be largely a function of weather conditions and traditionally, national production often exceeds the 2 million MT level in copra terms. The United Coconut Association of the Philippines approximates local coconut output this year to reach about 2.5 million MT and Post predicts local coconut production in 2010 to remain flat (2.5 million MT) compared to the previous year's level. CNO production during both years, on the other hand, is expected to be in the vicinity of 1.6 million MT. However, more CNO is expected to be made available for domestic CME production starting this year due to the drop in CNO exports overseas as a result of the global economic crisis. Local bio-diesel production during the year is estimated at 150 million liters.

The Philippine government (GRP) is also aggressively pushing for the cultivation of *Jatropha curcas* as an alternative bio-diesel source. The GRP has also announced its plan to launch massive propagation and cultivation of *jatropha* seeds covering around 2 million hectares of unproductive and idle public and private

lands nationwide. This effort will reportedly produce about 5,600 million liters of bio-fuel in the next 10 to 12 years and will likely free up CNO for bio-diesel production for the domestic and export markets. The Philippine National Oil Co.-Alternative Fuels Corp. is leading the campaign for the cultivation of *jatropha*.

Technical issues remain, however, in the commercial cultivation of *jatropha* as an alternative bio-diesel feedstock. Among others, *jatropha* is still not included in the Philippine National Standards and hence, specific varieties have reportedly not yet been identified for commercial planting. Consequently, yields at the farm level and milling extraction rates have not yet been established. Technical parameters and/or the absence of such make pricing assumptions very variable, and ultimately make business planning decisions very difficult. Industry contacts have also informed Post that environmental questions also need to be addressed.

While compliance by locally produced CME with the mandated bio-diesel blend appears to be satisfactorily met with no major glitches (refer to CONSUMPTION), local production of bio-ethanol has been problematic making the timely compliance with the mandated blend possible only through imported bio-ethanol. To date, there are 12 bio-diesel plants currently operating and capable of producing 395 million liters of CME annually. This compares to only 2 ethanol production facilities in commercial operation with a combined annual production capacity of roughly 40 million liters. Domestic bio-ethanol production this year, however, is estimated to be less than the annual capacity at 30 million liters due to delayed plant operations.

The sugarcane industry is currently the major supplier of feedstock for the production of local bio-ethanol. Like coconut production, annual sugar cane output has been above the 2 million MT level in recent years. According to the December 2008 "Roadmap to Bio-ethanol through the Sugarcane Industry Route" prepared by the Sugar Regulatory Commission (SRA), the sugar industry is currently producing more than 10 percent surplus sugar that could supply a percentage of the country's initial needs for bio-ethanol. The SRA adds that cane provides the highest yield of ethanol per hectare compared to other crops (with the possible exception of sweet sorghum, the worth as feedstock of which remains to be proven locally). Only a portion of existing sugarcane areas equivalent to surplus production will be utilized for ethanol production while the rest will be obtained from expansion areas. The SRA reportedly is currently in the thick of R & D on the potentials of sweet sorghum for ethanol production. The appropriate variety is likely to be determined soon by scientists of the University of the Philippines at Los Baños.

Agricultural Crops as Feedstock	Yield per Hectare	Liters Ethanol per Ton	Liters Ethanol Yield per hectare/yr
Cassava	7.75	180	1,395
Sweet Sorghum	50**	60	6,000*
Sugarcane	65	70	4,550
*Two (2) crops per year			
** Experimental values at this point			

Source: Sugar Regulatory Commission

Other salient notes from the SRA's December 2008 bio-ethanol roadmap regarding cane hectareage follow:

- The sugarcane industry will have to grow from the 398,872–hectare cropped for sugar on year 2007-'08, which is about 18 percent in excess of the area needed for domestic sugar self-sufficiency, to an aggregate hectareage that will supply feedstock for both sugar and bio-ethanol starting CY 2008-09 as needed, without affecting sugar self-sufficiency.
- Estimates for crop year 2007-08 showed a 10 percent excess in sugar production (In excess of Domestic + US Quota + World Market requirements) equivalent to around 40,000 hectares of sugarlands that can be devoted for bio-ethanol production.
- Come 2008-09, some cane areas dedicated to sugar shall start shifting to feedstock for ethanol.
- In the succeeding crop years, hectareage for bio-ethanol will continue to grow, through expansion of existing sugarcane districts and/or opening of new green areas.

Sugarcane and sugarcane area requirements to meet the mandated 5 and 10 percent ethanol blends are provided in the Table on Ethanol Distilleries in the CONSUMPTION Section.

CONSUMPTION

In 2006 (most readily data available), overall Philippine oil consumption was estimated at roughly 100 million liters, according to the DOE. Of this total amount, 62.55 percent was used for transportation, 14.09 by the industry, 8.50 percent by residences, 5.03 percent by the commercial sector, 6.81 percent for power and 3.02 percent by the agricultural sector.

The potential petroleum-fuel displacement as a result of RA 9367 is summarized below.

Potential Fuel Displacement			
Ethanol Blend	Gasoline Displacement (million liters)	Bio-diesel Blend	Diesel Displacement (million liters)
5%	268	1%	78
10%	721	2%	209

Source: DA Bio-diesel Feedstock Program

There are currently 12 bio-diesel plants capable of producing 395 million liters annually. At a 2 percent blend (which took effect February 2009), an estimated 140 million liters of CME is required annually or double the 70 million liters required to comply with the 1 percent blend. The excess CME production capacity is indicative of the industry's potential as a CME exporter in the years to come.

For bio-ethanol, based on the Philippine Energy Plan (2007-2014), a 5 percent minimum blend will need around 208 million liters of ethanol by 2009. With a 10 percent blend, 461 million liters (inclusive of consumption growth rate) will be needed by 2011.

Year	% Blend	Liters Ethanol*	Sugarcane Area**	Sugarcane**
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		(millions)	(hectares)	(metric tons)
2009	5%	208.11	45,738	2,973,000
2010	5%	218.93	48,116	3,127,571
2011	10%	460.63	101,237	6,580,429
2014	10%	536.29	117,866	7,661,286

*Source: Philippine Energy Plan, 2007-2014

** Assuming 70 liters ethanol/ton cane & 4,550 liters ethanol/hectare

According to the Bio-ethanol Update from SRA, at a rated capacity of 100,000 liters per day and an overall efficiency of 85 percent, around nine (9) bio-ethanol distilleries should be operational to comply with the 2009 mandated requirement, and a total of 18 distilleries to meet the 10 percent mandated blend by 2011. To date, there are only 2 ethanol production facilities in commercial operation, however. The San Carlos Bio-energy facility and Leyte Agri-Corp. plant both started ethanol-extraction operations this year. Both have a combined annual production capacity of 39 million liters (refer to Table below) but output this year is expected to be below-capacity due to the delay in completion. At the current mandated 5 percent bio-ethanol blend, however, overall annual demand this year is estimated at 208 million liters for an annual deficit of roughly 170 million liters of bio-ethanol (equivalent to an estimated 2.43 million MT of sugar cane or 37, 360 hectares.

Following is a table on Ethanol Distilleries, their corresponding operational timetables and required target areas as of December 5, 2008.

Investor	Distillery		Crop Year		Distillery Type / Feedstock Used	Cane Hectarage		
	Location	Rated Capacity (Million liters/yr)	Construction	Operation		Existing	Expansion	Total
1. Bronzeroak, San Carlos Bioenergy	San Carlos, Negros Occ.	30	2006-07	2008-09	Stand Alone / Sugarcane & Molasses	5,000	-	5,000
2. Leyte Agri-Corp.	Ormoc, Leyte*	9	2007-08	2008-09	Molasses	-	-	-
4. Roxol Bio-energy	La Carlota, Negros Occ.	30	2008-09	2009-10	Molasses	-	-	-
Cavite Bio-fuels	Maragondon Cavite	37.5	2008-09	2009-10	Stand Alone / Sugarcane & Molasses	2,500	3,500	6,000
5. Fuel Inc.	Binalbagan, Negros Occ.	30	2008-09	2010-11	Stand Alone / Sugarcane & Molasses	7,000	-	7,000
6. Bio-fuel Int'l	Central Negros	38	2008-09	2010-11	Stand Alone/Sugarcane / Sweet Sorghum/Molasses	2,000	-	2,000
7. Negros Biochem	Bago, Negros Occ.	30	2008-09	2010-11	Stand Alone / Sugarcane & Molasses	7,000	-	7,000
8. Bronzeroak, Southern Bukidnon	Kibawe, Bukidnon	45	2007-08	2010-11	Stand Alone / Sugarcane & Molasses	9,000	2,000	11,000
9. Bronzeroak, Capas	Capas, Tarlac	30	2008-09	2010-11	Stand Alone / Sugarcane & Molasses	5,000	5,000	10,000

JGC / ITOCHU	San Mariano, Isabela	30	2008-09	2010-11	Stand Alone / Sugarcane & Molasses	-	7,000	7,000
JG Summit	Manjuyod, Negros Or.	30	2008-09	2010-11	Molasses	-	-	-
12. Bio-fuels 88	Bataan*	18	2008-09	2010-11	Molasses	-	-	-
. North Cotabato	N. Cotabato	-	2008-09	2010-11	Molasses	-	-	-
Robson Agro Ventures	Cotabato	60	2008-09	2010-11	Cassava	-	-	-
Alson's Power	Misamis Or.	30	2008-09	2010-11	Cassava	-	-	-
16. Eastern Petroleum	Sarangani/ Cotabato	30	2008-09	2010-11	Cassava	-	-	-
Basic Energy	Zamboanga del Norte	30	2008-09	2011-12	Stand Alone / Sugarcane , Molasses & Cassava	-	6,250	6,250
E-cane Fuel	Lal-lo, Cagayan	45	2008-09	2011-12	Stand Alone / Sugarcane & Molasses	-	20,000	20,000
Daebong LS	Negros	30	2008-09	2011-12	Molasses	-	-	-
20.. "Interested Party"	Bogo, Cebu	30	2009-10	2011-12	Adjunct / Sugarcane & Molasses	6,500	2,000	8,500
21. Palawan Bio-energy	Aborlan & Narra, Palawan	30	2009-10	2011-12	Stand Alone / Sugarcane & Molasses	-	7,000	7,000
TOTAL		640.5				44,000	52,750	96,750

* Distillery using molasses as feedstock, hence, no effect on existing sugarcane areas

** Total target capacity includes bio-ethanol from cassava

Source: Sugar Regulatory Commission

TRADE

According to trade data from the World Trade Atlas (WTA), imports under the tariff for HS 3824.90.90 or Other Chemical Industrial Products and Preparations of the Chemical Industry (likely including CME) in 2008 reached 29,669 MT, up from the 26,869 MT in 2007. Imports were dominated by China, U.S. and Singapore. CME (HS 3824.90.90) tariffs are currently at 3 percent, unchanged from the 2007 level, but may be imported duty-free if coming from the ASEAN-member countries. According to WTA data, 3,979 MT of CME were exported under the same heading in 2008 compared to 2,491 MT the previous year. The majority of CME exports last year were destined for Italy and India.

Bio-ethanol, according to the Philippine Tariff Commission, falls under HS 2207.20.11 or Ethyl Alcohol Strength by Volume of Exceeding 99%. Bio-ethanol imports last year reached 4,817 MT, up from 2,055 MT in 2007. The top 3 suppliers of bio-ethanol imports last year were Thailand, Brazil and Singapore. Bio-ethanol has an MFN tariff of 10 percent from 2008 through 2010 but is currently charged a cheaper duty of 5 percent if originating from the ASEAN region. Bio-ethanol tariffs may be subject to a tariff of 1 percent if the importer is DOE-accredited, however. Bio-ethanol exports in 2008, on the other hand, reached 3.3 MT.

Bio-fuel imports in 2008 were significantly pared down as the projected bio-ethanol imports did not materialize despite the expected delays in the completion of the first ethanol plant. Exports during the period, on the other hand, are lower than the reported WTA due to the other uses of CME and ethyl alcohol. Imports are likely to surge starting this year due to the insufficient capacity to produce local bio-ethanol. The

NBB has already authorized the importation of roughly 185 million liters to cover the of 2009 bio-ethanol supply-demand gap. Imports during the period are likely to originate from Thailand and Brazil. Bio-fuel imports in 2009 are expected to be all bio-ethanol. The import figure in the Table on Bio-fuel Production/Consumption/Trade represents the NBB-approved bio-ethanol import volume for 2009. The figure likely took into consideration production from the two existing plants and is smaller than the projected bio-ethanol deficit this year (at 208 million liters).

It should be noted that bio-fuel importation is only allowed when there is a deficiency in local production. The deficit may be imported by local oil companies within 4 years from the time the specific bio-fuels blend (and not the Law or RA 9367 as reported in the previous annual report,) became effective. This means that, should local bio-ethanol continue to be produced in inadequate amounts, the deficit can only be imported through 2013. Beyond this time, the mandated percentage blend will be reduced to that level local production can only supply. The final blend percentage is to be decided by the NBB.

STOCKS

Overall year-ending bio-fuel stocks are expected to strengthen in 2009 and increase from the 2008 level in view of the likely implementation of the higher bio-diesel blend. Higher CME stocks will be enhanced by the expected improvement in CNO production as a result of dampened export demand during the year as a result of the global slowdown. For bio-ethanol, higher stocks, largely from imports, are expected as a result of the projected deficit and delays in local bio-ethanol production.

MARKETING

Philippine oil companies started selling diesel with one (1) percent CME in May 2007. The higher bio-diesel blend of 2 percent was implemented in February 2009. There were no reported major obstacles during the transition to a higher bio-diesel blend. Initially, bottled-CME was available in gas stations and dealers and manual blending was undertaken by the vehicle owners. Today, the CME industry basically utilizes the existing downstream oil industry infrastructure in blending and distribution. This has encouraged the DOE to study the possibility of increasing the required bio-diesel blend to 3 percent from the present 2 percent by end of this year. The DOE reportedly has a technical committee on petroleum product standards that is currently studying and formulating guidelines of the higher 3 percent bio-diesel blend. Domestic coconut oil refiners, on the other hand, are discussing with the GRP the possibility of promoting an even higher blend of 5 percent bio-diesel blend in order to capitalize on the current depressed copra and CNO prices.

For bio-ethanol, the 5 percent blend became effective also in February of this year. Local oil companies have largely been complying with the mandated blend using imported bio-ethanol. Some companies have even been selling gasoline with a 10 percent bio-ethanol called E10. This is because the 5 percent ratio is reckoned on the oil companies' total sales of gasoline for the year. To illustrate, a company may sell 50 percent of its gasoline at E10 and the other 50 percent unblended and still be compliant to RA 9367. By 2011 however, all gasoline sold should have a minimum 10 percent ethanol blended in it, according to the Bio-fuels Law. This complicates implementation of the Law as it requires periodic inspection of oil stations

by the DOE.

STATISTICAL SECTION

Quantity of Feedstock Use in Bio-fuel Production in MT						
		2005	2006	2007	2008	2009
Biodiesel						
Vegetable Oil						
	Soybean Oil	0	0	0	0	0
	Rapeseed Oil	0	0	0	0	0
	Palm Oil	0	0	0	0	0
	Coconut Oil	1,000	5,000	40,000	80,000	150,000
	Animal Fats	0	0	0	0	0
	Recycled Vegetable Oil	0	0	0	0	0
	Other	0	0	0	0	0
Ethanol						
	Corn	0	0	0	0	0
	Wheat	0	0	0	0	0
	Sugaracane	0	0	0	0	385,000
	Sugar beat	0	0	0	0	0
	Rye	0	0	0	0	0
	Molasses	0	0	0	0	0
	Wood	0	0	0	0	0
	Cassava/tubers	0	0	0	0	0

Source: Post estimates

Bio-fuel Production/Consumption/Trade (in million liters)					
	2005	2006	2007	2008	2009
Bio-diesel/ethanol					
Beginning stocks*	0	0	1	4	4
Production	1	5	40	80	180
Imports	1	1	1	5	185
Total supply	2	6	42	89	369
Exports	0	1	3	4	5
Consumption	2	4	35	75	330
Ending stocks*	0	1	4	10	34

Source: Post estimates